

Commodity Highlight: Chile Peppers

The U.S. produces 4 percent of the world's sweet and pungent (chile) peppers, ranking sixth behind China, Mexico, Turkey, Indonesia, and Spain. 1/ Output of all peppers in China has been rising steadily over the past decade, moving from one-third of world output in 1993-95 to one-half of production during 2003-05. During this time, output of sweet and pungent peppers more than doubled in Mexico, reflecting duty-free export opportunities (afforded by NAFTA) to expanding markets in Canada and the United States.

Chile peppers, which can range from very pungent (hot) to relatively mild, likely originated in South America and were brought to Europe by Columbus. Like tomatoes, potatoes, eggplant, and tobacco, chile peppers are part of the nightshade (solanaceous) family. Chile peppers and sweet (bell) peppers are related in that most cultivated chile peppers and bell peppers belong to the species called *Capsicum annuum*. Although the fruit of the chile pepper is considered a vegetable, in botanical circles chile peppers are deemed berries. 2/

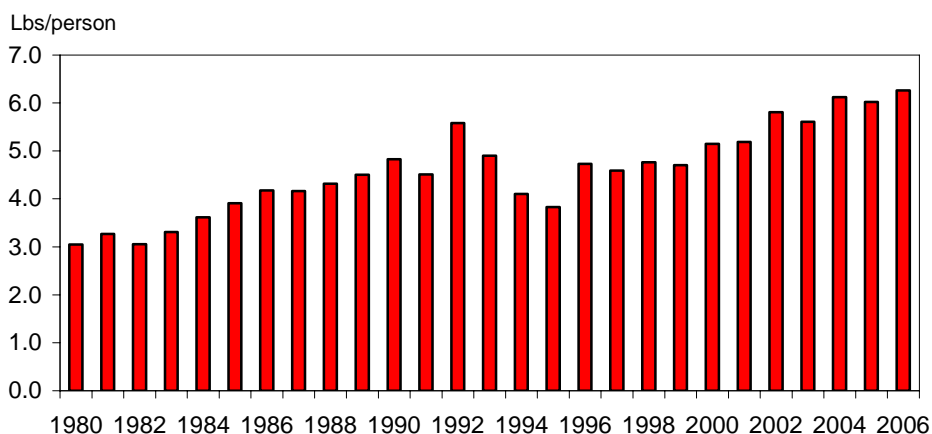
Over the last decade, U.S. disappearance (use) of chile peppers has increased by 38 percent, moving from an annual average fresh-weight equivalent of 4.3 pounds per person during 1993-95 to 5.9 pounds during 2003-05. On a fresh-weight basis, consumers in the United States now use more chile peppers than many traditional vegetables, including asparagus (1.3 pounds), cauliflower (2.1 pounds), and green peas (3.3 pounds). The trend in chile consumption remains positive this decade, with average use during the first 6 years of the 2000s just below the growth experienced during the 1990s (when use rose 25 percent from the 1980s). Chile peppers were one of the fastest growing specialty produce items of the late 1980s and early 1990s and remain popular today. This is an illustration of the changing American diet, the quest for alternative flavors and coloring agents, and the growing influence of a diverse immigrant population.

Chile Is Grown in 49 States

According to the Census of Agriculture, 4,748 farms harvested chile peppers from 42,666 acres in 2002. This was up from 2,087 farms and 27,990 acres in 1987, with most of the gain in acreage occurring during the late 1980s and early 1990s.

Figure 10

U.S. chile peppers: Per capita disappearance, 1980-2006



Source: Economic Research Service, USDA.

1/ FAOStat database (1/2006), Food and Agriculture Organization, United Nations.

2/ Bosland, Paul. "Capsicums: Innovative Uses of an Ancient Crop." Chapter in "Progress In New Crops." Edited by Jules Janick. ASHS Press. 1996.

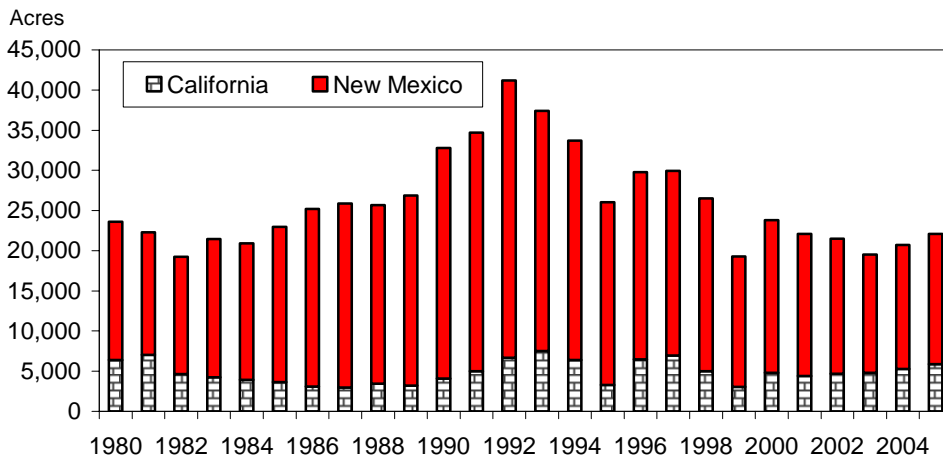
Chile? What's In a Name?

Confusion over terminology began with Columbus, who gave peppers their name thinking that they were the black peppercorns of the Indies. The genus for peppers, *Capsicum*, includes both sweet varieties, commonly called bell peppers, and hot varieties usually known as chile peppers. As for spelling, in the industry, chile generally means the hot pepper, chili refers to the spicy meat and bean dish, and chilli is the ground spice containing chiles.

Another confusion is mistaking a whole species or type of chile pepper for a single cultivar. The five domesticated species in the pepper genus, *C. annuum*, *C. frutescens*, *C. chinense*, *C. pubescens*, and *C. baccatum*, contain dozens of pod types and hundreds of cultivars. Except for the tabasco chile pepper in the *C. frutescens* species and the habanero and Scotch Bonnet in *C. chinense*, most chile peppers fall into the *C. annuum* species.

Figure 11

U.S. chile peppers: Harvested area in New Mexico and California



Sources: From 1980-1999, New Mexico Agricultural Statistics Service and California County Agricultural Commissioners. After 1999, NASS, USDA.

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ational chile pepper harvested area has drifted lower since peaking in 1992 at 50,851 acres. Like sweet bell peppers, a small volume of chile peppers is also produced in greenhouses.

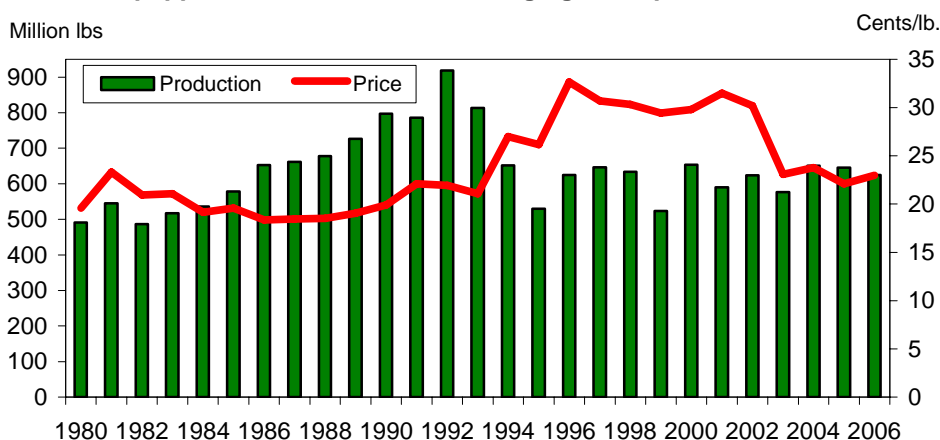
In 2002, every State except Alaska reported having at least one farm growing chile peppers. While 54 percent of all chile acreage is harvested for processing (canning, drying/dehydrating, freezing) in the United States, only 7 percent of farms with chile peppers harvest for processing. New Mexico accounts for 50 percent of all chile acreage devoted to processing, followed by California (16 percent), Texas (13 percent), and Arizona (6 percent). By inference, the leading fresh-market States are New Mexico with 25 percent of fresh-market area and California with 20 percent. Florida, Texas, and Georgia follow--each with about 7 percent of fresh-market chile area.

From 2001 to 2005, farm cash receipts for chile peppers averaged \$113 million, with New Mexico accounting for about 41 percent. The national chile pepper crop value is estimated by ERS to be undercounted by 30 percent, since only the top 4 States (NM, CA, AZ, TX) in terms of acreage are included in the annual NASS production and value survey. The retail (consumer) value of chile peppers is not reported but estimates based on farm-retail value margins for bell peppers suggest it may exceed \$500 million.

New Mexico Is Top Chile Producer

According to the 2002 Census of Agriculture, chile peppers were harvested on 282 farms in New Mexico. In fact, the largest concentration of chile acreage in the United States is in southern New Mexico, centered largely in the Hatch valley and outside the city of Las Cruces. The counties of Luna, Dona Ana, and Hidalgo account for about three-quarters of the State's chile acreage. According to the 2002 census, New Mexico harvests 39 percent of all chile pepper acreage in the United States, with 71 percent of its area earmarked for processing. Grower receipts from the sale of chile peppers averaged \$46 million annually during 2002-04, accounting for 8 percent of the State's crop cash receipts.

Figure 12

U.S. chile peppers: Production and average grower price, 1990-2005 1/

1/ Prices not adjusted for inflation. Those prior to 2000 are based on New Mexico prices.

Source: ERS estimates based on available State data and NASS estimates.

California also has substantial chile pepper acreage, with 5,210 acres harvested on about 396 farms. Chile production is disbursed widely within the State, with about one-third in Monterey county and substantial area in both Ventura and Santa Clara counties. Production for the fresh market is dominant, accounting for about three-fourths of output. California chile pepper cash receipts averaged \$45 million annually during 2002-04, boosted by fresh market sales, which have much higher unit values than product for processing.

Arizona chile pepper area totaled 4,955 acres and was produced on 58 farms, according to the 2002 Census of Agriculture. Most of the production (about 81 percent) takes place in the southeastern county of Cochise and is largely grown for processing. The farm value of the Arizona chile pepper crop averaged about \$8 million annually during 2002-04.

Texas (459 farms and 4,350 acres) and Florida (77 farms and 1,460 acres) are also important chile pepper States. While two-thirds of the Texas crop is processed, virtually all Florida chiles are shipped into the fresh market. In 2004, Florida shipped more than 27 million pounds of chile peppers, with most volume moving during the spring and fall seasons.

Chile Peppers Are Hot

Chile peppers can be processed into a variety of food and industrial products. A versatile crop, when chiles are consumed in dried forms, they are considered (and used as) a spice. However, chiles are consumed not only as a food or a spice; they also have other interesting and important uses. Some of these uses (described below) are derived from a unique compound found in chile plants called capsaicin (chemical name *trans-8-methyl-N-vanillyl-6-nonenamide*). This substance is the source of the sometimes memorable burning sensation that usually occurs after biting into a chile pepper. Pepper pungency is rated in terms of "Scoville heat units." At the bottom of the list is the bell pepper, which has no capsaicin and is rated at zero on the Scoville heat unit scale of pungency. The popular Jalapeno pepper ranges from 2,000 to 25,000 units and Tabasco peppers (*Capsicum*

frutescens) range between 60,000 to 80,000 units. The Habenero and Scotch Bonnet chile peppers (both *Capsicum chinense* species) are considered to be among the hottest in the world and are rated as high as 1 million Scoville units. The best antidote to capsaicin's heat is said to be milk, since a protein in milk helps to douse the peppery fire.

As in sweet (bell) peppers, red and green chiles come from the same plant but are picked at different stages of maturity (red is the mature stage). For most major varieties (although not all), chile in the red stage is not as pungent (hot) as when green. Green chile is used primarily fresh or for canning and less commonly for freezing. Red chiles are primarily used in salsas, for dehydrating, or as a dried whole product with small quantities frozen, sold fresh, or used decoratively. Some fresh red chile peppers are dried and used to make strings and wreath-like good luck charms called ristras. In the southwestern U.S. and into Mexico, it is considered a good omen to hang a ristra on your front door. Ristras are also popular as tourist souvenirs in New Mexico.

Chile peppers are also used to produce food coloring agents, ornamental strings and wreaths, and have been closely studied for their pain-killing and germicidal properties. Dyes made from red chile peppers are natural and safe food coloring agents used in many products, including salad dressings, meat products, cosmetics, and clothing. Capsaicin creams and salves derived from chile pepper extracts are used for relief of pain known as neuralgia, and are also effective for temporary relief of pain from osteoarthritis and rheumatoid arthritis.

Americans have been consuming chile peppers in a myriad of salsas, hot sauces, Southwestern-style foods such as enchiladas, tamales, huevos rancheros, and many other chile-enhanced vegetable entrees. In addition to adding zest and flavor to various dishes, chile peppers can be very nutritious, with strong vitamin C content in fresh peppers, good vitamin A (especially in dried red peppers), and various antioxidant properties.

In processing for canning or freezing, chile peppers are first peeled (using a blanching steam) because the peel is not digestible by humans. According to the Pickle Packers International, there are a variety of pungent pickled pepper products such as fiery jalapeños, hot green and red cherry peppers, mildly hot pepperoncini, and golden pickled banana peppers. Cayenne peppers are small, pungent chile peppers that are ground to a fine powder to produce a seasoning known as red pepper. Chili powder is made from mildly hot varieties. Paprika, which means pepper in Hungarian, is a red pepper spice produced from any one of a variety of bright-red, mild peppers. As a spice, paprika can be mild or hot, depending on the manufacturer. Paprika is also widely used as a food coloring agent in processed meats, soups, cheeses, and other foods.

Chile Imports Expanding

Trade in chile peppers centers around fresh and dried spice products. Although dried/dehydrated pepper exports have been rising in recent years, fresh-market pepper exports are not broken down by sweet and pungent types. ERS estimates suggest chile pepper exports are relatively small compared with imports, with about 7 percent of total U.S. chile pepper supply exported. Meanwhile, trade data (expressed on a fresh-equivalent basis) indicate that imports accounted for 72

Table 18--U.S. chile pepper import value, 2002-05 1/

Item	2002	2003	2004	2005	Change 2004-05
	-- Million dollars --				Percent
<i>Fresh market:</i>	167.7	208.7	226.5	236.6	4
Mexico	166.9	197.0	213.0	234.6	10
Canada	0.1	9.8	11.1	0.4	-96
Others	0.6	1.9	2.5	1.6	-37
<i>Dried/dehydrated: 2/</i>	79.6	76.7	84.5	81.3	-4
Mexico	28.3	25.2	19.5	25.2	29
India	18.5	16.6	22.8	20.1	-12
China	14.4	16.1	20.7	17.8	-14
Others	18.4	18.8	21.4	18.2	-15
<i>Canned: 3/</i>	11.6	13.2	14.7	19.1	30
Mexico	6.3	6.3	6.8	9.0	33
Turkey	0.6	1.2	2.6	3.6	38
Peru	0.2	0.3	1.2	2.5	104
Others	4.5	5.4	4.1	3.9	-4

1/ U.S. customs value. 2/ Excludes paprika powder. 3/ Excludes pimientos.

Source: Bureau of the Census, U.S. Department of Commerce.

percent of domestic supply during 2003-05. Because of rising domestic import demand for both fresh-market and manufacturing (food and other) uses, import penetration has steadily increased over the past two decades, with the share of domestic use coming from imports moving up to current levels from 37 percent during 1983-85 and 44 percent during 1993-05.

Compared with vegetables such as bell peppers and tomatoes, seasonal variation in chile pepper imports is relatively small, reflecting consistent monthly domestic demand. On average over the past 5 years, there was a slight dip in chile import volume during the spring, likely reflecting peak pepper production in Florida. Fresh chile pepper imports tend to be strongest during the summer months prior to harvest in major producing States such as New Mexico.

Imports have helped meet the accelerating demand for chile peppers. The U.S. imported 425 million pounds of fresh chile peppers in 2005, about 82 percent more than a decade earlier. Also, dried and dehydrated chile pepper spice imports more than doubled during this period and were valued at over \$81 million (excluding paprika).

Mexico, one of the largest consumers and producers of chile peppers in the world, provides 99 percent of U.S. fresh-market chile imports. Most of Mexico's chile pepper production is in the northwestern coastal plain states of Sinaloa and Sonora where much of the export-oriented vegetable production is located. Chihuahua, an irrigated producing region bordering New Mexico and Texas, is also a source of chile peppers shipped to the United States.

Although Mexico is also the leading source for imported chile pepper spices, accounting for \$25 million of the total in 2005, other areas of the world are important. India and China are also important sources for dried and dehydrated chile pepper products. In terms of customs import value, the top five sources of

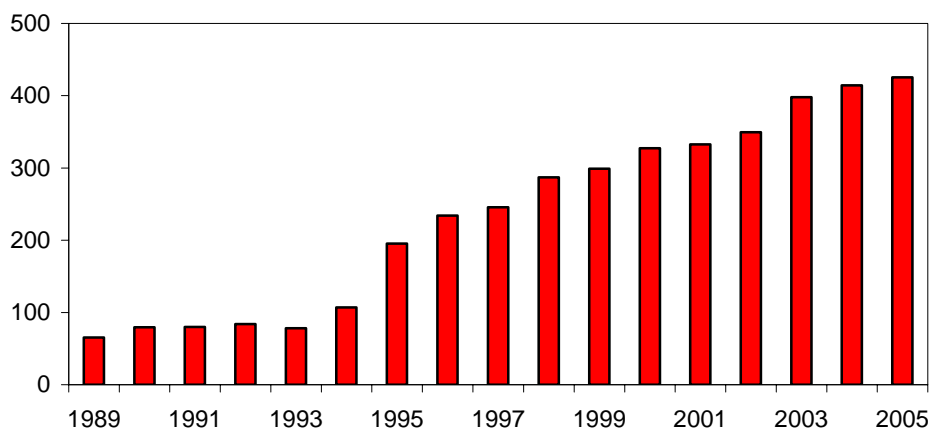
dried chile pepper spices in 2005 were Mexico (31 percent), India (25 percent), China (22 percent), Peru (7 percent), and Chile (3 percent). In 2004, India was the top source in terms of dried/dehydrated chile spice valued at \$23 million.

The U.S. also imported \$19 million in canned chile peppers, led by Mexico (47 percent), Turkey (19 percent), and Peru (13 percent). Although paprika is not generally considered a chile pepper product since it is usually extracted from mild peppers such as the pimiento, about \$7 million in extracted oleoresins (essential oils and resinoids) from paprika were imported in 2005, with most coming from India (77 percent) and Spain (15 percent).

Figure 13

Fresh-market chile peppers: U.S. import volume, 1989-2005

Mil lbs.



Source: Bureau of the Census, USDC.

Table 19--U.S. chile peppers, all uses: Estimated supply, disappearance, and price

Year	Supply			Utilization			Season-avg. price	
	Production 1/	Imports 2/	Total	Exports 2/	Domestic 3/	Per capita use 4/	Current dollars 1/	Constant dollars 5/
	-- Million pounds, fresh-w eight --					Pounds	-- \$/cwt --	
1985	578.7	361.5	940.2	7.7	932.5	3.91	7.03	10.09
1990	797.5	463.7	1,261.2	52.8	1,208.4	4.83	7.16	8.77
2000	653.9	910.4	1,564.3	109.4	1,454.9	5.15	29.80	29.80
2001	589.9	1,029.6	1,619.5	137.6	1,481.9	5.19	31.50	30.76
2002	624.4	1,177.1	1,801.5	127.2	1,674.3	5.81	30.20	29.01
2003	576.8	1,196.9	1,773.7	140.1	1,633.6	5.61	23.10	21.79
2004	651.1	1,276.5	1,927.6	129.7	1,797.9	6.12	23.80	22.00
2005 f	645.8	1,249.9	1,895.7	112.3	1,783.4	6.02	22.10	20.04
2006 f	625.0	1,377.0	2,002.0	129.0	1,873.0	6.26	--	--

-- = Not available. f = ERS forecast. 1/ Source: ERS based on NASS, USDA data. 2/ Converted to a fresh-w eight (w et) basis by ERS from data provided by the Bureau of the Census, USDC. Trade includes fresh, canned, and dried/dehydrated products. Excludes paprika and pimientos. 3/ Domestic disappearance for all uses, including shrink and loss. 4/ Expressed on a fresh-w eight equivalent basis. To convert to dry-w eight, divide by 8. 5/ Constant dollar prices calculated using the GDP deflator, 2000=100.

Source: Economic Research Service, USDA.